

National Aeronautics and
Space Administration

LAGNIAPPE

Volume 22 Issue 4

John C. Stennis Space Center

April 22, 1999

The world comes together to help celebrate Earth Day '99

Today, people all across America are celebrating the Earth and its natural wonders. They too, are making others aware of the problems that the planet still faces 29 years after the first Earth Day was proclaimed.

NASA has launched numerous satellites through the years into low-Earth orbit to analyze the Earth and its systems.

Earth System scientists at Stennis Space Center use remotely sensed imagery received from satellites and aircraft of the Earth to determine the extent of devastation from natural disasters, study the oceans as well as its plant and animal life, and to determine the health of crops.

If scientists are able to understand how the Earth's systems function, then more can be done to repair past damage.

All of this is being done in an effort not only to improve quality of life, but also the quality of Earth.

NASA has worked hard to let the



United States and the world know what could be lost if Earth is not protected.

NASA's primary mission is the exploration and development of space, but the Agency also feels an obligation to provide a better understanding of the most important planet—the Earth.s

Earth Day began in 1970, and from it came the Clean Air Act and the Clean Water Act. It also helped elected officials to create the Environmental Protection Agency.

Due to this special celebration of our planet and the legislation that has followed, air quality has improved by 42 percent in the U.S. since 1980. Between 1968 and 1993, highway vehicle emission of carbon monoxide dropped 96 percent. Water quality has also dramatically improved. Between 1975 and 1993, the amount of organic wastes released into water fell by 46 percent; the release of toxic organics fell by 99 percent; and the release of toxic metals by 98 percent.

Stennis scientists help to make cotton farming a science

Thanks to assistance provided by NASA's Commercial Remote Sensing Program Office at Stennis Space Center, farmers can benefit from space program technology.

Prescription farming, the ability to tailor soil and crop management to fit site-specific conditions, is one of the many projects the office is working on to find commercial uses for remote sensing information.

The Commercial Remote Sensing Program at Stennis has targeted the country's agricultural production — food and fiber — as an area to help in the application of remote sensing technology and information.

The Commercial Remote Sensing Program Office has worked with Kenneth Hood, a cotton farmer in the heart of the Mississippi Delta, to assist in prescribing solutions to farming problems.

The goal of the prescription farming project is to explore the possibility of using remote sensing and Geographic Information



During a visit to Hood Farms, NASA Administrator Daniel Goldin presented Kenneth Hood with a plaque for outstanding service in support of NASA research in remote sensing. Pictured from left are Commercial Remote Sensing Program Manager at Stennis David Brannon, Stennis Space Center Director Roy Estess, Dr. Andy Jordan with the National Cotton Council, Goldin, Hood, Michael Seal with ITD/Spectral Visions, Associate Administrator of Space Flight Joe Rothenburg with NASA Headquarters, Dr. Jac Varco with Mississippi State University, Johnny Williams with Global Positioning Solutions, and Johnny Thompson also with Mississippi State University.

Systems technologies as an aid to reduce the high cost of crop production and to increase crop yield.

"Converging geospatial technologies will allow agribusiness to farm by the foot instead
See FARMING, Page 8

LAGNIAPPE Commentary

An earthly beginning...

I had just finished looking up some old Apollo material when Gator dropped by to see me. He was holding a big garbage bag full of some kind of foul-smelling trash and had a catch net attached to a long, wooden pole resting on his shoulder.

"Well, Mr. Lagniappe Man, I hope you're writing about our Earth Day observance. We need all the help we can get this year with the increasing population on the Gulf Coast and in the area around Stennis Space Center," Gator said in an important sounding voice.

"Not really, Gator," I replied, "but I am writing about the Apollo space flights to the Moon in the 1960s. That ought to count for an environmental piece, since many folks believe that the 1968 Apollo 8 Christmas mission around the Moon gave us the first breathtaking view of the planet Earth from the vantage point of space."

"You're just full of earthy trivia today, my historian friend," Gator replied. "Tell me more before I head down to the beach and start picking up litter."

"I'll be happy to—after all, that is one of the reasons I am here. You do know, Gator, that the crew of Apollo 8 were so taken by that fantastic view of Earth that they referred to our home planet as a 'beautiful, fragile ball,' like a Christmas tree ornament. The pictures they brought back to Earth got people all around the world thinking about the fact that we are all in this together and should be taking better care of this 'fragile ball.' You may recall, however, that many Americans originally began thinking about the state of the planet back in 1963, when President Kennedy went on a nationwide conservation tour during which he spelled out, in dramatic language, the serious and deteriorating condition of our environment. During this tour, he proposed a comprehensive agenda that would address the problems facing the Earth and what we could do about them. Unfortunately, most Americans did not adopt his plan for reversing the situation, even though many of them acknowledged that there were legitimate problems developing that needed to be addressed."

"That's all very interesting," Gator said. "But tell me how Stennis Space Center got involved in preserving our planet."

"Gator, you ought to remember that," I exclaimed. "When the Apollo program began to slow down, we started looking for another important mission to undertake. At the same time, we at Stennis began to realize that people all over the world were becoming more concerned about saving our planet. In response, we got busy before the first Earth Day celebration on April 22, 1970, and began developing a strategy. We met with representatives from federal and state agencies in order to develop a plan that would be good for the future of Stennis and for the survival of the planet. We asked these men and women to join us in the business of using airplanes and satellite data to study the Earth."

"And today the tradition lives on," Gator bragged. "As Mr. Paul Harvey says, 'that's the rest of the story. Good day.'"

M.R.H.



NASA NEWSCLIPS

Scientists try to create oxygen—NASA engineers have succeeded in a realm often left to alchemists and magicians — creating something valuable "out of thin air." In this case, the thin air was a simulated Martian atmosphere, and the valuable commodity was oxygen.

This is an initial test of technology that will be aboard the Mars Surveyor 2001 Lander, scheduled to launch April 10, 2001, and to land on Mars on Jan. 22, 2002.

Called the Mars In-Situ Propellant Production Precursor, the experiment will test the feasibility of using the thin Martian atmosphere to produce oxygen for breathing air and propellants.

Propellants created on Mars could eventually be used to send samples and astronauts back to Earth.

The primary test involves an experimental device inside a Mars environment chamber that selectively absorbs carbon dioxide from a simulated Martian atmosphere—called "Mars mix"—and converts it to oxygen. This technology also may be used to extract pure oxygen from Earth air for home, medical and military needs.

Veteran team chosen to repair Hubble—NASA will launch a Space Shuttle mission to the Hubble Space Telescope in October so astronauts can replace portions of the spacecraft's pointing system, which has begun to fail.

Hubble is operating normally and continuing to conduct its scientific observations, but only three of its six gyroscopes — which allow the telescope to point at stars, planets and other targets — are working properly. Two have failed, and another is acting abnormally. If fewer than three gyroscopes are operating, Hubble cannot continue its science mission and automatically places itself in a protective "safe mode."

A team of veteran astronauts had already begun training to install the new instruments and upgrade the telescope's systems when the problems began.

NASA astronauts Steven Smith, C. Michael Foale, John Grunsfeld and European Space Agency astronaut Claude Nicollier will perform the spacewalks on both servicing missions. Smith is the payload commander for the missions, coordinating the astronauts' space-walking activities.

Special Olympics held at Stennis

Stennis Space Center hosted the 1999 Mississippi Area III Special Olympics Field Day March 27 for athletes from Hancock, Harrison, Pearl River and Stone counties.

Stennis Space Center has hosted the event since 1983.

Jane Johnson, Contract Specialist for NASA's Procurement Business Management Office, and chairperson for the annual event said volunteer efforts, much like the sponsorship challenge this year, has been the backbone of Stennis' successful participation in the annual event.

"It takes a lot of people to pull the event off each year," she said. "Ideally, we need two volunteers for each athlete. This year, more than 600 volunteers came out to help with getting athletes to and from their sports, running the events and manning the food and refreshment tents. I tell everyone who volunteers, 'Don't do this unless you don't mind getting hugs.' I have never heard an athlete say they didn't have a good time."

See OLYMPICS, Page 9



Participants and volunteers at this year's 17th Annual Area III Special Olympics Games at Stennis Space Center March 27 did a dance during opening ceremonies. More than 250 participants and more than 600 volunteers participated in the day-long event. Stennis winners will proceed to the state games at Keesler Air Force Base in Biloxi, Miss.

Representatives meet to discuss mission of HEDS

NASA's Human Exploration and Development of Space (HEDS) Enterprise representatives participated in a customer engagement workshop hosted by Stennis Space Center March 31 through April 1.

The workshop, staged from the electronic Strategic Planning and Consensus Engagement (e-SPACE) Collaboratory—an electronic teleconferencing center that uses two-way audio and video—was convened and chaired by Darrell Branscome.

Branscome, deputy administrator for HEDS Enterprise Development at NASA Headquarters in Washington, D.C., is responsible for developing the strategy for opening the space frontier and for HEDS technology, commercial, outreach and education activity.

According to NASA's Mark Craig, deputy director of Stennis Space Center, the workshop's purpose was to develop an integrated approach to significantly increase HEDS' value to more people.

Twenty-two attendees from various NASA centers and Headquarters were present at the workshop.

"Tom Shaver, senior partner at J.D. Power



NASA representatives from across the country came to Stennis Space Center to hold a strategic planning session concerning the Human Exploration and Development of Space Enterprise, or HEDS. Pictured from left are J.D. Power and Associates senior partner Tom Shaver, Johnson Space Center Creative Outreach Manager Phil West, Johnson Space Center Public Affairs Officer Barbara Zelon, NASA Headquarters Office of Space Flight external liaison Alotta Taylor, Chief of the Education and University Affairs Office at Stennis Dr. David Powe and Stennis Space Center Deputy Director Mark Craig.

and Associates, provided insight into commercial best practices for providing value to customers," Craig said. "The workshop developed a framework to determine customer need and increase value by shaping HEDS programs around those needs. The key to the framework was the determination of HEDS' value areas: human experience/entertainment, knowledge, space commerce, education, technology, services—including propulsion test and leadership."

The participants agreed to develop a process to determine people's needs and what they value. It was decided to shape programs and activities to meet those needs and deliver value within NASA's mission of exploring space and opening the space frontier. Two immediate opportunities will be pursued—add a human experience listening post to the HEDS Web site, and commission a HEDS engagement testbed at the Kennedy Space Center Visitor Complex.

New hybrid testing to begin this month

Test firing of a new hybrid rocket motor is set to begin in May at Stennis Space Center.

The Hybrid Propulsion Demonstration Program will test a 250,000-pound thrust rocket motor—a demonstrator for a whole series of new hybrids.

The motor, which is similar in appearance to the solid rocket boosters used on the Space Shuttle, is 70 inches in diameter, approximately 45 feet in length, and weighs 125,000 pounds.

Hybrids are a new breed of rockets that have many advantages over conventional solid rocket boosters. They are safer because the oxidizer is contained in a separate part of the motor. Due to the presence of a separate oxidizer, hybrid motors can be throttled to control thrust levels; solid rocket boosters cannot. Hybrids can also provide greater thrust in fewer numbers, which could be less expensive than boosters.

Stennis Space Center's E test complex will conduct a series of tests on two separate rocket motors this year. The 250k motor is a small-scale demonstrator that



A 250,000-pound thrust hybrid rocket motor awaits testing at Stennis Space Center. The Hybrid Propulsion Demonstration Program will test the 70-inch diameter, 45-foot long and 125,000-pound motor in May. Hybrids are a new breed of rockets that have many advantages over conventional solid rocket boosters.

will illustrate robustness and scalability.

Scalability means that what works on a smaller version of the motor may work on a larger version.

The Hybrid Propulsion Demonstration Program's 250k hybrid rocket motor was

designed and constructed by a consortium of aerospace corporations. Companies involved in the program's consortium are: Lockheed Martin Astronautics, Boeing-Rocketdyne, Lockheed Martin Michoud

See HYBRID, Page 9

Another element to be rolled out in Russia

The formal rollout and ribbon-cutting ceremony for the Service Module element of the International Space Station will be held April 26 at RSC-Energia in Moscow.

Top NASA, Russian Space Agency, RSC-Energia and European Space Agency space station officials will hold a press conference immediately before the rollout. After the ceremonies, the Service Module will be prepared for shipment to its launch site at Baikonur, Kazakhstan. It is scheduled to be launched later this year for linkup as the third element of the International Space Station.

The Space Shuttle and two types of Russian rockets will conduct 45 missions to launch and assemble the more than 100 elements that will comprise the completed International Space Station. In all, 460 tons of structures, modules, equipment and supplies will be placed in orbit by the year 2004.

The International Space Station continues to be the largest scientific cooperative program in history, drawing on the resources and scientific expertise of 16 nations.

STS-96 will bring supplies to space station for its first crew

An international crew of seven will become the first visitors to the new International Space Station since its launch and start of orbital assembly last year, when Discovery lifts off on Space Shuttle mission STS-96.

Targeted for launch at 9:32 a.m. EDT Thursday, May 20, Discovery will be the first shuttle to dock with the new station since the crew of Endeavour departed the outpost in December 1998. Discovery's four-man, three-woman crew will bring more than 5,000 pounds of supplies to be stored aboard the station for future crews—equipment ranging from laptop computers, a printer and cameras to maintenance tools, spare parts and clothing.

Discovery will spend five days linked to the station, transferring and installing gear that could not be launched aboard the modules due to weight limitations. Discovery's mission sets the stage for the arrival of the first station living quarters, the Russian-provided Service Module, scheduled to be launched by Russia later

this year. Discovery's flight is the first of four shuttle assembly missions scheduled to visit the station this year.

Navy Commander Kent Rominger, 42, will command Discovery's crew, which includes cosmonaut Valery Tokarev, 46, a colonel in the Russian Air Force, and Canadian astronaut Julie Payette, 35, as mission specialists. Rick Husband, 41, will serve as pilot of Discovery, and a spacewalk will be performed by astronauts Tammy Jernigan, 40, and Daniel Barry, M.D., 42, while Discovery is docked to the station. Jernigan and Barry will attach a U.S. spacewalkers' "crane" to the exterior that will assist in future assembly activities. Parts of a Russian "crane" also will be attached. Mission Specialist Ellen Ochoa, a two-time shuttle veteran, rounds out Discovery's crew as flight engineer and mission specialist. Ochoa will operate the shuttle's mechanical arm from inside the cabin during the spacewalk.

Discovery is planned to spend 10 days in orbit, landing at Kennedy May 30.

Stennis scientists research ancient Louisiana sand dunes

Two NASA research scientists at Stennis Space Center are trying to find out how ancient sand dunes in central Louisiana were formed.

Dr. Marco Giardino and Dr. Ramona Pelletier Travis, both with the Earth System Science Office, are using NASA technology to assist Dr. Ervin Otvos, a scientist with the University of Southern Mississippi's Department of Coastal Science, to gather more detailed information about several hills and mounds that are grouped around the Tangipahoa and Natalbany rivers in three Louisiana parishes near Hammond.

"Dr. Otvos has been working with this kind of terrain for 25 to 30 years," Travis said. "He has looked at these mound features, which he considers as ancient dunes, because finding these features inland in this area is much less common than near the coastline. They are an intriguing landscape feature of the region."

These dunes are thought to have formed towards the end of the Pleistocene ice age, approximately 10,000 years ago. Through the centuries, the dunes have become overgrown with vegetation and large trees and now resemble rolling hills.

There are two theories about how the dunes were formed. The first is that old stream channels eroded the land around them, forming these rare features. This theory implies that much of the land around the present-day dunes had been at least as high as the present dune tops and was later eroded by water.



From left, NASA's Dr. Marco Giardino and Dr. Ramona Pelletier Travis, research scientists with the Earth System Science Office at Stennis Space Center, and Dr. Ervin Otvos, with the University of Southern Mississippi's Department of Coastal Sciences, run a ground-penetrating radar over an ancient sand dune in the Hammond, La., area. The NASA scientists were assisting Otvos in gathering data to confirm his theory about the development of ancient dunes in an inland area.

The theory being researched by Otvos and the NASA scientists states that this area was much drier than it is now. Winds blew sand, likely from the riverbanks, to gradually form the dunes.

The Earth System Science Office has ground-penetrating radar that uses radar wave pulses through the ground to get a better idea of the composition of subsurface soils. The results can be used to determine if the soil

layers are naturally occurring or were altered in some way by humans, as well as indicate the presence of relics, such as ancient tools, ordinary stones, or archeological features such as houses and firepits.

"Stennis Space Center is the primary NASA center for Earth-based, ground-penetrating radar research," Travis said.

The ground-penetrating radar used by

See DUNES, Page 9

Rockets fill E-3

Testing at Stennis Space Center's E-3 test facility is running at full pace with both of its testing cells occupied.

The E-3 facility is currently being used to test new hybrid and hydrogen peroxide rocket technology propulsion systems. The facility is divided into two separate testing areas, or cells, that can test different types of hardware — components and engines.

Currently, cell one of the facility is conducting horizontal testing for Lockheed Martin Michoud Space Systems' hybrid technology program. Conventional rocket engines are usually classified as liquid or solid propulsion engines. Hybrids, as the name suggests, are a mix between liquid rocket engines and solid rocket motors.

Hybrid motors use a solid fuel that is mixed and poured into a motor case and allowed to set until it is in a solid state.

A big advantage of hybrids over solid rocket motors is the safety and control mechanism. Since solid propellants have oxidizer mixed with the fuel, one stray electric spark or impact can ignite a solid rocket motor.



A hydrogen peroxide engine is test fired at Stennis Space Center's E-3 test facility. The developmental engine, being tested for Orbital Sciences Corporation in cell two of the facility, is part of a low-cost propulsion system that uses hydrogen peroxide as the oxidizer propellant.

Once started, the engine will continue to burn until the fuel has been completely consumed. Hybrids, on the other hand, are composed of inert fuel grains that are totally insensitive to spark ignition or mechanical impact. The thrust of the motor can be controlled and throttled, or shut down, during its flight, simply by

controlling the flow of oxidizer into the motor.

"We're trying to figure out the best performance for different conditions," said NASA's Gary Taylor, test director for the E-3 facility. "We're looking at different composition materials that are put into the fuel grain,

See E-3, Page 8

NASA is a family affair for this happy couple

NASA's Steve and Mary Gene Dick have witnessed the growth of Stennis Space Center from a testing facility located in a Mississippi swamp, in the early 1960s, to a world-class propulsion testing facility.

Mary Gene is the secretary for the director and deputy director of the Center Operations Support Directorate. The directorate is responsible for running the "city" of Stennis Space Center and making sure that the necessary infrastructure and services are in place so operations will run smoothly. As the secretary for the directorate, she "does a little bit of everything," such as tracking travel and training budgets and coordinating schedules for the director and the deputy.

Originally from Gulfport and now living in Pass Christian with her husband, Steve, Mary Gene graduated from Gulfport High School and attended the University of Southern Mississippi. She first came to the Mississippi Test Facility in 1965 as a secretary in the center manager's office. "That was before we (the center) had a director," Mary Gene said.

She followed the center's deputy manager when he went to work with the activation task force for NASA. After activation, she moved to the S-IC and S-II project offices where she worked until joining the facility engineering division. She stayed there until Hurricane Camille struck the Mississippi Gulf Coast.

"The Governor's Emergency Council asked NASA for some support, so NASA sent a task team to the Seabee Center," Mary Gene said. "We worked down there for about six months or so with the council working on hurricane recovery."

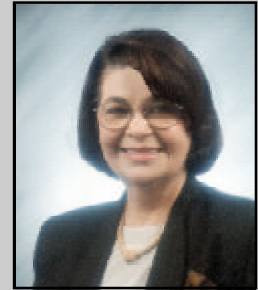
After helping the coast recover from Camille, she returned to the south Mississippi facility and has worked in a number of programs including NASA's human resources office, the Advanced Solid Rocket Motor project, the NASA procurement office, the institutional services division and, finally, the Center Operations and Support Directorate.

It was while working at the NASA facility in the mid-1960s that Mary Gene met the man who is now her husband, Steve.

Steve is the planner for the Propulsion Test Directorate at Stennis. His job involves planning in terms of contracts, facility modernization and construction of facilities.



Steve and
Mary Gene Dick



Steve grew up in New Roads, La., but graduated from Jefferson College High School in Natchez, Miss.

After serving in the United States Air Force for two years, he attended the United States Military Academy in West Point, N.Y., where he graduated with a bachelor's degree specializing in general engineering. Upon graduation, Steve served in the Army for three years.

Following his time with the Army, he went to work for Pratt and Whitney in West Palm Beach, Fla., as a test conductor for the RL-10 engine that would be used in the Centaur program and the early Saturn program.

Steve came to Stennis Space Center, then the Mississippi Test Operations, in late 1964 to work for General Electric doing test facilities construction, surveillance and activation.

In 1966, he began to work for the Boeing Co. as lead engineer for testing on the Saturn S-IC stage. At the end of the test program, he went to the Michoud Assembly Facility in east New Orleans as a test conductor on post static firing checkout of the Saturn S-IC stage for Boeing.

Steve returned to the space center in 1972, working with Global Associates as a project engineer on the activation of the A and B test stands for the shuttle program. Later, he worked as a project manager for construction of facilities and other modifications of base facilities. In 1978, he was hired by NASA as a facilities engineer.

"I worked on design and construction of facilities projects," Steve said. "Later, I was promoted to chief of the Propulsion Support Division. In 1988, I transferred to Propulsion Test Operations with the same responsibilities—managing support of the shuttle program."

SSC Employee Profile



He has also served as chief of the Project Support Office and chief of the engineering division within the Propulsion Test Directorate. In 1997, Steve became the planner for the Propulsion Test Directorate; the position he now holds.

Steve is preparing to retire at the end of 1999 after working at Stennis for 35 years, with 21 of those years with NASA.

At home, both Steve and Mary Gene like to work in their yard. They are both active in the First Methodist Church of Gulfport. He likes to play golf. Their daughter, Stephanie, is married and is a chemical engineer working for DuPont in Texas. Steve also has two other daughters from a previous marriage, Karen and Sonya, who live in California.

Both Steve and Mary Gene like the space program and enjoy being a part of it. "I've loved working out here," Mary Gene said. "When I first came, it was a whole new world to me. The people were exciting and talking about putting a man on the Moon. It was just thrilling. Things have changed a lot, but we still have some wonderful, exciting people out here."

"In the early 60s, I fell in love with rockets and rocketry. I enjoy working with test operations," Steve said. "I really enjoyed doing what I've done with respect to rocket testing. I'm glad to see the buildup of activities at Stennis. I think the future is looking pretty bright for Stennis Space Center."

Students from across Mississippi and Louisiana gather in front of the "Giant Squid Grid" outside the Visitors Center at John C. Stennis Space Center. The students constructed the grid following a daylong program, during which they learned about the habitat and behavior of the giant squid. The students also heard from Dr. Clyde Roper, a renowned biologist from the Smithsonian Institution and an expert on the giant squid.



Stennis, Smithsonian help students search for a giant squid

More than 200 students from Mississippi and Louisiana recently spent the day at Stennis Space Center learning about one of the world's most elusive creatures—the giant squid.

"In Search of the Giant Squid" was presented by the NASA Education and University Affairs Office at Stennis Space Center and the Smithsonian National Museum of Natural History as part of the Natural Partners Program.

Jack Tamul, a physical scientist with the

Naval Oceanographic Office at Stennis, briefed the students on the habitat of giant squid. He explained that in certain areas, like off the coast of New Zealand, the temperatures are ideal for sustaining plant life. The giant squid feed on the animals that eat the plants.

Also, Breck Whitworth, a teacher in the Marine Biology Program at Gulfport High School, discussed the anatomy and behavior of these giant cephalopods.

"We are really fortunate to be on the

cutting edge of technology today," Whitworth said.

"They are bringing us right to the place where the exploration is taking place."

The highlight of the day came when the students were able to speak to Smithsonian scientist Dr. Clyde Roper live via videophone from his expedition headquarters off the coast of New Zealand.

Roper conducts extensive research on the

See SQUID, Page 10

GLOBE students and scientists learn about the Earth together

Providing students with a greater sense of responsibility for their environment is one of the primary goals of the Global Learning and Observations to Benefit the Environment (GLOBE) program, initiated by Vice President Al Gore in April 1994.

GLOBE is an international, hands-on environmental science program for students in grades K-12. GLOBE-trained teachers assist students around the world to collect real data that is used by scientists to study the environment.

Many of the teachers from the communities surrounding Stennis come to the center to receive GLOBE training. The center serves as a franchise-training site for the nationwide program. As such, Stennis undertakes the responsibility of recruiting GLOBE schools and training GLOBE teachers.

During the training sessions, teachers learn the proper protocols for collecting data in



Participants in a recent GLOBE workshop learn how to measure the amount of rainfall at their GLOBE site. During the workshops, educators become familiar with the proper protocols for collecting and measuring rainfall and for recording the data on the GLOBE Web site. These procedures are used by GLOBE participants all over the world.

four areas: atmosphere, hydrology, soil and land cover. The many resident agencies at Stennis offer assistance in the teaching of these protocols.

In the past, employees from NASA, the Navy and Lockheed Martin Stennis Operations, as well as participants in the Summer

Faculty Program, have assisted the Educator Resource Center staff in teaching GLOBE activities and procedures.

By integrating these studies into their curriculum, teachers provide students with an opportunity to become better acquainted with

See GLOBE, Page 10



Steve Nunez (left), NASA's X-33 project manager at Stennis, explains the differences between the X-33 and the shuttle during the recent "Ask About Science" program. The X-33 is a half-scale prototype that will demonstrate, in flight, the new technologies needed for a Reusable Launch Vehicle. The programs, sponsored by NASA's Education and University Affairs Office at Stennis and the Mississippi Authority for Educational Television, feature an interactive format. Students at participating schools have the opportunity to question scientists and engineers at Stennis about the work that is done at the center. Also pictured is Glen Vanderbeek, distance education facilitator for the education office.

NASA Ames Research Center Director Henry McDonald and members of his staff paid a visit to Stennis Space Center April 13 to learn more about the center's missions and activities. Pictured left are Peter Norvig, chief of Ames' Computational Sciences Division at Moffett Field; Rick Gilbrech, engineering division chief of the Propulsion Test Directorate at Stennis; Joseph Coughlan, with Ames' Ecosystem Science and Technology Branch; McDonald; Jack Hansen, deputy director for research at Ames; Stennis Space Center Director Roy Estess; and Estelle Condon, chief of Ames' Earth Science Division.



E-3...

(continued from Page 5)

different patterns in which the fuel is poured and shaped, and how the hybrid technology concept can support other propulsion systems."

Development testing is being conducted in E-3's cell two (vertical test position) for Orbital Sciences Corporation on a low-cost upper stage propulsion system that uses

hydrogen peroxide as the oxidizer propellant.

Cell two was activated in October 1998 and started testing in November. The theory behind the hydrogen peroxide engine is simple. Hydrogen peroxide, at rocket-fuel grade, decomposes when introduced to a catalyst.

The process is similar to the reaction of vinegar when mixed with baking soda, except on a larger and more powerful scale. This produces thrust sufficient to move objects in low-Earth orbit and in the vacuum of space.

This type of rocket engine can also be kept in storage, on Earth or in space, for long periods of time without the need for temperature control or the concern about settlement or boil-off of propellant.

"The E-3 Test Facility has become the busiest test facility here at Stennis Space Center," said NASA's Robert Bruce, project manager for E-3 test projects. "The E-3 team has done an outstanding job in accommodating the needs of our customers."

FARMING...

(continued from Page 1)

of by the field," said Bruce Davis, chief scientist of NASA's Commercial Remote Sensing Program Office at Stennis Space Center. "This will permit a more efficient and effective use of fertilizer, herbicide and insecticide application, while maintaining yield at an optimum."

Remote sensing uses sensors on aircraft or satellites to take detailed images of the surface of the Earth. These images can be used to construct very accurate maps for such applications as disaster assessment.

Using different wavelengths of light,

sensors can detect unfavorable growing conditions in plants and crops before the problem becomes visible to the human eye. The images taken of the crops are used to form maps that can show areas in need of more or less water or fertilizer.

This saves time and money for the farmer and minimizes pollution from fertilizer runoff.

"The National Cotton Council is behind an initiative to help identify technologies that will decrease the unit cost of production by 10 cents per pound," said Andy Jordan, director of technical services with the National Cotton Council and executive director of the Cotton Foundation.

"This can be done by increasing yields, decreasing inputs or both. It is in this broad

area of precision management that we think that these efficiencies can be gained. That's the reason we place a high priority on building the alliance with space-age technologies and agriculture."

Similar research projects are also being conducted at the Jamie Whitten Research Center in Stoneville, Miss., and at Mississippi State University in Starkville.

"NASA plays an important part in the evolution of agricultural technology by leveraging an investment made in science and technology," Davis said. "In particular, the fundamental work done by NASA in biology, plant physiology and agronomy is critical to the success of a growing high-tech agribusiness industry."



Stennis Super Chefs, from left Larrie Kelly, Bo Clarke and Kevin Power serve up a sample of Clarke's red beans and rice to Bay St. Louis Police Chief Frank McNeil. The Stennis Super Chefs competed against approximately 40 teams in the 10th Annual Red Beans and Rice Cook-off held at the Hancock County Civic Center in Bay St. Louis. This is the second time Clarke and the Stennis Super Chefs have competed. Clarke's recipe, perfected through the years, is a mix of necessity and pleasure. His mom was a great cook, but when he got to college in Starkville he was on his own. Clarke, a facilities engineer who has been at Stennis for 13 years, lives in Long Beach. His co-chefs for the day: Kelly, of Diamondhead, works in Institutional Services and has been at Stennis for 28 years; and Power, of Mandeville, La., works in the Lead Center Development Office and has been with the center for 10 years. Proceeds from the cook-off benefited the American Cancer Society.

HYBRID...

(continued from Page 4)

Space Systems, Thiokol Corporation and United Technologies Chemical Systems Division.

The motors use a solid fuel that is mixed and then poured into the casing of the motor and allowed to set and turn into a rubbery, semisolid form, similar to how gelatin is mixed, poured and allowed to set until it becomes solid. By itself, the fuel will not burn, which is what makes hybrids safer than solids. To ignite the motor and continue the process of ignition during its flight profile, an oxidizer must be injected into the core of the motor, which has been hollowed out to allow greater surface area for combustion. The oxidizer must be continually fed into the motor as long as the motor is required to function. When the flow of the oxidizer stops, the motor shuts down.

The two tests that will be conducted on the two motors at Stennis involve different methods of ignition, as well as different methods of injecting the oxidizer. Motor 1 will use Triethyl-aluminum and

Triethyl-boron as the igniter and a conical injection system at the top of the motor near the conical nose section of the booster.

Motor 2 will have two tests conducted on it using a staged combustion igniter. Motor 2's injection system will feature an axial injection system that runs the length of the motor, introducing the oxidizer to the surface of the fuel.

Once tests of the 250k hybrid motors are concluded, the program will be over, unless the consortium wishes to conduct further tests on the 250k series or decides to proceed to developing and testing larger thrust motors.

"We've been working very hard to get to first test on this project," NASA's Robert Bruce, project manager for the 250k project, said. "The consortium has been looking forward to this for some time. And, Stennis Space Center will also inaugurate 'full-scale' testing at the E-1 test facility. So, in that regard, the significance of this first test is even greater."

OLYMPICS...

(continued from Page 3)

Not all of the competition surrounding the games at Stennis took place on the field. Employees from Johnson Controls Work Services Shops in Building 2204 and 2205 went head-to-head with employees of Continental Steel Iron Workers Local 58 and Industrial Constructors, Inc. Pipefitters Local 568 to see who could sponsor more Special Olympics athletes. "It started out as a challenge between the Johnson Controls employees," Johnson said. "Somehow, the unions got word, and they got involved."

Johnson said the competition apparently paid off. Approximately 300 athletes signed up to participate in this year's event with more than 250 actually competing. "Participation this year was at an all-time high," she said. Proceeds will be used to take the regional athletes to state and national competitions.

To make plans to volunteer for next year's Special Olympic Games, sponsor an athlete or make a donation, call Johnson at Ext. 3681.

DUNES...

(continued from Page 5)

Travis and Giardino is produced by Geophysical Survey Systems Inc. The Stennis Space Center team and Otvos conducted a shallow subsurface survey collecting eight radar profiles across three large mounds.

The profiles, averaging 20 feet in depth, showed a difference between the muddy, gravelly sand of the original base soil material and the overlying muddy sands.

According to Otvos, these radar findings appear to support the theory that the muddy sand material was deposited and formed dunes in the area, not by water transport and erosion, but rather, by wind activity.

According to Travis, radar scans of one of the three mounds revealed readings similar to those gathered in preliminary scans of Native American mounds.

"The third mound that we scanned looks suspiciously like a Native American mound we saw in Marksville, La.," Travis said. "We see some better defined layering of soil materials near the top, and we see interesting anomalies inside the mound that could be artifacts."

Travis and Giardino are working on plans to return to the mound. They want to investigate whether these features may indicate human disturbance of the surface.

Giardino's and Travis' research will add to the knowledge of how features of the Earth were formed, as well as past climate conditions.

**Safety
Corner**

Planning ahead will keep your family safe in the event of fire

If you do not already have a fire escape plan, there is no better time than today to map one. The following are basic steps to keep your family safe in the case of a fire:

1. Decide which parent or older child is responsible for which younger child.
2. Set off a smoke detector so your children are familiar with the warning sound.
3. Mark the windows and doors from which your children can safely escape. Show them at least two escape routes from their bedrooms, and teach them never to hide under the bed or in a closet in the case of a fire.
4. Make sure escape routes are cleared of obstructions like toys or boxes.
5. Make sure all windows are easily opened.
6. Practice crawling skills. Teach the kids to stay close to the ground if there's a fire, and show them how to keep their noses and mouths covered with a towel or T-shirt to reduce smoke inhalation.
7. Designate an outdoor meeting area that's in view of the front door and a safe distance from the house.
8. Practice the escape route every six months. And, don't forget to show the routine to babysitters.

QUICK LOOK

■ **Special low-cost cellular phone rates are now available for all Stennis employees** who live in Hancock, Harrison and Pearl River counties and St. Tammany Parish, La. For more information, contact your agency representative: NASA Ext. 7227, CNMOC Ext. 4896, JCWS Ext. 3732, CHL Ext. 3366, USGS Ext. 1521, NRL Ext. 4010, CSC 2302, NAVO Ext. 4938, NDBC Ext. 1704, LMSO Ext. 1835, DCMC Ext. 1055, Boeing/Rocketdyne Ext. 2708, MSAAP 689-8907, and the Navy HRC Ext. 813-1000.

■ **Take Your Daughters to Work Day** is being celebrated today. The program is designed to inspire young women to pursue careers in science and technology. Many activities are planned for the students throughout the day, as well as observing day-to-day activities of center employees.

■ **The Stennis Space Center Recreation Association Gun & Archery Club** is offering a Personal Protection and Basic Firearm Safety course from 8:30 a.m. until 6 p.m. Saturday, May 1 and 8:30 a.m. until 4 p.m. Sunday, May 2. The program is an intensive two-day study of basic handgun skills. Six NRA certified instructors will provide one-on-one instruction in the handling and owning of a firearm. No experience is required; any interested person may attend. Cost per person is \$25 and includes ammunition and course materials. Contact John Leonard at (504) 641-2478, or Mike McKinion Ext. 2352 for more information.

SQUID...

(continued from Page 7)

diversity, morphology, behavioral systematics and biology of cephalopods, including the giant squid.

Roper and Bernard Vernon, a specialist on sperm whales, are studying the behavioral patterns of these large mammals in hopes of locating a giant squid in its natural habitat. Researchers have discovered that sperm whale feed on giant squid. Roper theorizes that, by using underwater microphones to determine the diving depths of the sperm whale, his team will be able to locate and film giant squid.

GLOBE...

(continued from Page 7)

the environment.

"Students become scientists and begin to see a reason for studying the environment and how it affects our lives and the world in which we live," Nelda Peace, an aerospace education specialist at Stennis, said.

Students also have the opportunity to compare their findings with schools throughout the world and recognize global differences. GLOBE students make environmental observations at or near their schools and report their findings on the Internet. Currently, students and teachers from more than 6,000 schools in more than 70 countries are part of the program.

Through the program, a worldwide network of students, teachers and scientists are working together to study and understand the global environment.

For more information on the GLOBE program, visit the Stennis Space Center GLOBE Web site at http://education.ssc.nasa.gov/htmls/trc/globe_franchise.htm, or the GLOBE home page at <http://www.globe.gov/>.

LAGNIAPPE

Lagniappe is published monthly by the John C. Stennis Space Center, National Aeronautics and Space Administration. Roy Estess is the center director, Myron Webb is the public affairs officer, and Lane Cooksey is the news chief. Comments and suggestions should be forwarded to the Lagniappe Office, Building 1200, Room 208, Stennis Space Center, MS 39529, or call (228)688-3583.

EDITOR:.....Sharon Koenenn Saucier

CONTRIBUTING WRITERS:

Robert Collins.....Betty Ruth Hawkins
.....Courtney Thomas

CONTRIBUTING PHOTOGRAPHERS:

B.J. Dauro.....Charles Jones
ARTIST:.....Douglass Mayberry



National Aeronautics and
Space Administration

John C. Stennis Space Center
Stennis Space Center, MS 39529

Official Business
Penalty for Private Use \$300

BULK RATE
U.S. POSTAGE PAID
Permit No. G-27